The axially extending central portion **46** is supported at each end and may be designed for substantial deflection to accommodate load sharing deflection. In the merged zone **50** the outer portion **48** overlays and is integral with the central portion. This produces an increased stiffness in this central merged zone. Accordingly, the curvature of surface **44** in this zone will be slight compared to the overall deflection which is predominantly taken in the outboard portions **62** of the central portion.

The outer portion **48** has cantilever sections **52** which extend from the merged zone **50**. The loading on these portions caused them to deflect downwardly in a direction opposite to the deflection of the central portion of the pin. The depth of the groove **54** and the overall geometry is selected such that the resultant curvature of surface **44** approaches a straight line.

The discussion above to some extent treated cantilever sections **52** as conventional cantilever beams. Since they are in fact cylindrical members it must be recognized that deflection of this portion can tend to cause ovalization of the structure resulting in less clearance at another point around the periphery. For the purpose of deterring this ovalization, reinforcing ribs **64** may be located at the outer edge of the cantilever portions.

In carrying out the inventive concept aimed at linearizing the axial trace of surface **44**, there are many variables to be taken into account which make it difficult to specify the ideal geometry. The load imposed along the surface **44** is not uniform since the oil pressure stays relatively high throughout a major portion of the length, but drops off toward the ends. The modulus of elasticity of the particular material and the allowable stresses must be considered in establishing factors such as the thickness of cantilever portion **52** and the concomitant length thereof. Basically, the thickness in merged zone **50** tends to minimize local deflection there, while the reduced diameter of outboard portions **62** permit appropriate counter deflection. The outboard cantilever portions **52** of the outer section **48** are selected with a counter deformation to achieve a straight line. Ovalization potential must be studied for the particular loading condition.

Relatively high stress and strain levels may be tolerated by this pin. In contrast to the bearing which is rotating with respect to the load imposed upon it, this is not the case with the pin. Once the load is established by the drive forces and the G-force, it is always applied at the same location on the pin. This means that cycling forces are not imposed and fatigue is less of a problem than it would be were the flexibility to be placed in the bearing side.

This is also true regarding the loading and deflection of the carrier. More or less end support of the pin, either by deflection or by looseness of the joint, produces less variation in the linearity of the pin bearing surface, than a conventional pin.

It is also noted that hole **56** may be centrally located within the pin to lighten the pin since this portion of the material does not contribute significantly to the function of the pin. This hole may then be conveniently used as the oil supply line to supply the required oil to the oil distribution recess **58**.

While the most desirable arrangement for any loading condition can only be determined by finite element analysis, a preliminary study indicates that the length of the cantilever portion **66** should be between 25 and 70 percent of the length of the merged portion **50**.

We claim:

1. A pin for a heavily loaded journal bearing comprising:

a substantially cylindrical central axially extending portion arranged for support only at each of its outboard ends;

a cylindrical outer portion housing an outer surface and is contiguous or integral with said central portion at an inboard merged zone and having cylindrical cantilever sections extending outboard from said merged zone in both directions, said cantilever sections concentrically surrounding and spaced from said central portion outboard of said merged zone, whereby under an applied oil film load said central portion deflects with a bend radius toward the load and said cantilever sections deflect with the bend radius away from the load; and

the geometry and material of said central portion and said outer portion selected such that the deflection of said outer surface under load approaches an axial straight line.

2. A pin as in claim **1**, further comprising:

a circumferential inwardly extending rib around the inner periphery of the outboard edge of each cantilever section.

3. A pin as in claim **1**, further comprising:

the length of each cantilever section being between 25 percent and 70 percent of the length of said merged zone.

4. A pin as in claim **1**, further comprising:

a central axial hole through a substantial portion of said central portion.

5. A pin as in claim **4**, further comprising:

an oil distribution recess located in the outer surface of said outer portion axially coextensive with a portion of said merged zone; and

said central axial hole in fluid communication with said oil distribution recess.

6. A high speed heavy load planetary gear assembly comprising:

a ring gear;

a sun gear;

a plurality of planet gears;

a planet carrier;

a journal bearing within each planet gear;

a plurality of pins within said plurality of planet gears, each pin secured at each outboard end to said planet carrier;

each of said pins comprising;

a substantially cylindrical central axially extending portion arranged for support only at each of its outboard ends;

a cylindrical outer portion having an outer surface and is contiguous or integral with said central portion at an inboard merged zone and having cylindrical cantilever sections extending outboard from said merged zone in both directions, said cantilever sections concentrically surrounding and spaced from said central portion outboard of said merged zone, whereby under an applied oil film load said central portion deflects with a bend radius toward the load and said cantilever sections deflect with the bend radius away from the load; and

the geometry and material of said central portion and said outer portion selected such that the deflection of said outer surface under load approaches an axial straight line.

7. A gear assembly as in claim **6**, further comprising: